

WHAT IS CLAIMED IS:

1. An apparatus, comprising:

a first reflecting panel that receives image information for a first color;

a second reflecting panel that receives image information for a second color and
a third color;

5 a temporal modulator that receives and modulates light that includes a first color
light, a second color light, and a third color light; and

a beamsplitting and combining element having a single reflecting/transmitting
surface that reflects and transmits said first color light to said first panel and said second and
third color light to said second panel and combines images reflected from said first reflecting
10 panel and said second reflecting panel.

2. The apparatus of claim 1, wherein said panels manipulate light polarization to
modulate pixel elements of said panels.

3. The apparatus of claim 2, wherein said panels are liquid crystal on silicon.

4. The apparatus of claim 1, wherein said beamsplitting and combining element
comprises a polarizing beamsplitter, wherein the first color light is input into the polarizing
beamsplitter with a first polarization and the second color light and third color light are input

into the polarizing beamsplitter with a second polarization essentially orthogonal to said first polarization.

5. The apparatus of claim 4, wherein the polarizations of the first color light and second and third color lights are produced from a single polarized input beam by an input stack filter.

6. The apparatus of claim 5, further comprising a chromatic polarizer optically coupled to said beamsplitting and combining element.

7. The apparatus of claim 6, wherein the chromatic polarizer is optically coupled to said temporal modulator and said beamsplitting and combining element, wherein the chromatic polarizer is in contact with the first, second and third color lights prior to the input of the color lights into the beamsplitting and combining element.

8. The apparatus of claim 6, wherein said chromatic polarizer polarizes the second and third color lights.

9. The apparatus of claim 4, further comprising a chromatic polarizer optically coupled to said beamsplitting and combining element.

10. The apparatus of claim 4, further comprising an output stack filter, wherein the output stack filter filters the first color light and the second color light and third color light to have essentially the same polarization when the images are combined.

11. The apparatus of claim 10, further comprising a neutral polarizer in contact with the first, second, and third color lights after the output of the color lights from the output stack filter.

12. The apparatus of claim 1, further comprising either an output stack filter and a neutral polarizer or an output chromatic polarizer.

13. The apparatus of claim 1, wherein said temporal modulator comprises a rotating color filter wheel.

14. The apparatus of claim 1, wherein said temporal modulator comprises a polarization stack filter.

15. The apparatus of claim 14, wherein said stack filter comprises a stack of birefringent layers and at least one active liquid crystal cell.

16. An apparatus, comprising:

a first transmissive panel that receives image information for a first color;

a second transmissive panel that receives image information for a second color
and a third color;

5 a temporal modulator that receives and modulates light that includes a first color
light, a second color light, and a third color light; and

a beamsplitting and combining element having two reflecting/transmitting
surfaces, one for reflecting or transmitting at least said first color light to said first panel, and a
second one for reflecting or transmitting said second and third color light to said second panel,
10 said beamsplitting and combining element further combines images from said first transmissive
panel and said second transmissive panel.

17. The apparatus of claim 16, wherein the reflecting surfaces are different.

18. An apparatus, comprising:

a first panel that receives image information for a first color;

a second panel that receives image information for a second color and a third
color;

5 a temporal modulator and polarizer unit that receives light that includes a first
color light, a second color light, and a third color light, and passes either said first color light and
said second color light or said first color light and said third color light; and

a single beamsplitting and combining device for directing said first color light to said first panel and said second or third color light to said second panel.

19. The apparatus of claim 18, wherein said temporal modulator and polarizer unit further passes said light to one of said first panel and said second panel.

20. The apparatus of claim 18, wherein said temporal modulator and polarizer unit comprises at least one active stack.

21. The apparatus of claim 18, wherein said temporal modulator and polarizer unit comprises at least one passive stack.

22. The apparatus of claim 18, wherein said temporal modulator and polarizer unit comprises at least two active stacks.

23. The apparatus of claim 18, wherein said temporal modulator and polarizer unit comprises a plurality of polymer films.

24. The apparatus of claim 18, wherein one of said first panel and said second panel comprises a liquid crystal display.

25. The apparatus of claim 18, wherein one of said first panel and said second panel comprises a liquid crystal on silicon display.

26. An apparatus, comprising:

a first panel that receives at least a first color light and outputs a first color image;

a sequential panel that sequentially receives a second color light and a third color light and sequentially outputs a second color image and a third color image;

5 a temporal modulator that receives and modulates light that includes said first color light, said second color light and said third color light;

a beamsplitter optically coupled to said temporal modulator, wherein said beamsplitter receives said light and directs at least said first color light to said first panel and said second color light and said third color light to said sequential panel, wherein said beamsplitter
10 further sequentially outputs said second color light and said third color light to said sequential panel to yield said second color image and said third color image, and wherein said beamsplitter combines said first color image with said second color image or said third color image, wherein said first panel, said sequential panel, and said temporal modulator operate cooperatively to yield a full color image to an observer.

27. The apparatus of claim 26, wherein said temporal modulator further outputs said light to one of said first panel and said sequential panel.

28. The apparatus of claim 26, wherein said temporal modulator comprises at least one active stack.

29. The apparatus of claim 26, wherein said temporal modulator comprises at least one passive stack.

30. The apparatus of claim 26, wherein said temporal modulator comprises at least two active stacks.

31. The apparatus of claim 26, wherein said temporal modulator comprises a plurality of polymer films.

32. The apparatus of claim 26, wherein one of said first panel and said sequential panel comprises a liquid crystal display.

33. The apparatus of claim 26, wherein one of said first panel and said sequential panel comprises a liquid crystal on silicon display.

34. The apparatus of claim 26, further comprising:
a second temporal modulator, wherein the two temporal modulators are dynamic, and provide rotation of polarization of one of said first color light and said second color light;

first and second filters, wherein said first and second filters polarize and rotate
5 said third color light; and
a clean up polarizer placed after the beamsplitter.

35. The apparatus of claim 34, wherein the first temporal modulator rotates the polarization of blue, the second temporal modulator rotates the polarization of green, and the first and second filters polarize and rotate red.

36. An apparatus, comprising:
a first reflecting panel that receives image information for at least one primary color;
a second reflecting panel that receives image information for a complementary color of said at least one primary color;
a first dynamic filter that receives and modulates light that includes said at least one primary color and said complementary color to said at least one primary color; and
a beamsplitting and combining element having a single reflecting/transmitting surface that reflects and transmits said at least one primary color to said first reflecting panel and said complementary color to said at least one primary color to said second reflecting panel and combines images reflected from said first reflecting panel and said second reflecting panel, wherein said at least one primary color and said complementary color to said at least one primary

color are received by the first dynamic filter followed by said beamsplitting and combining element.

37. The apparatus of claim 36, further comprising:

a second dynamic filter that receives and modulates the combined images from the first and second reflecting panels, wherein the second dynamic filter receives the images reflected from the first and second reflecting panels after the beamsplitting and combining element.

38. The apparatus of claim 36, further comprising a neutral output polarizer.

39. A method for projecting a full color display from a two panel system, comprising:

directing a light beam to a temporal modulator;

temporally modulating colors in the light beam;

5 splitting the light beam into a first color light beam and a second color light beam;

illuminating a first panel with at least said first color light beam;

illuminating a second panel with said second or third color light beam;

receiving and recombining light emitted from the illumination of the first and the
second panels; and

10 directing the recombined light through a projection lens.

40. The method of claim 39, wherein one of said first and second panels comprises a liquid crystal on silicon display.

41. The method of claim 39, wherein the step of temporally modulating colors in the light beam comprises using a three stage dynamic temporal modulator which rotates the polarization of each of the primary colors in turn while retaining the polarization of the corresponding complementary color, wherein the at least two spectral components of the light beam are the primary color and the corresponding complementary color.